ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 12| Issue: 9| September 2026|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2026: 8.753 || ISI Value: 1.188

THE PHYSIOLOGY OF NIDRA IN RELATION TO HOMEOSTASIS

Dr.Meghana D R[1]*
[1]*Assistant professor, Dept of Kriya Sharira, SDM college of Ayurveda and Hospital, Hassan.*

ABSTRACT
Nidra (sleep) is a fundamental physiological process that plays an important role in maintaining homeostasis, the body's ability to preserve a stable internal environment. In Ayurveda, Nidra is described as one of the Trayopastambha (three supporting pillars of life), along with Ahara and Brahmacharya[1]. Proper sleep is considered essential for bala (strength), pushti (nourishment), sukha (happiness), and overall health[2]. From a modern physiological perspective, sleep is a dynamic process involving coordinated changes in the nervous, endocrine, metabolic, and immune systems. During sleep, the body regulates energy metabolism, body temperature, cardiovascular activity, hormonal secretion, immune responses, and neural functions. Sleep also supports memory consolidation, tissue repair, and restoration of physiological functions. The interaction between sleep homeostasis and the circadian rhythm determines the timing and duration of sleep. Disturbances in sleep may disrupt metabolic, hormonal, immune, and psychological equilibrium, thereby affecting overall homeostasis. Therefore, understanding Nidra through both Ayurvedic and modern perspectives highlights its crucial role in maintaining physiological balance, promoting health, and preventing disease.
KEYWORDS: *Nidra, Sleep, Homeostasis, Sleep Homeostasis, Circadian Rhythm.*

INTRODUCTION

Sleep, referred to as *Nidra* in Ayurveda, is an essential physiological process that plays a fundamental role in maintaining health and equilibrium of the body and mind. Ayurveda considers *Nidra* as one of the *Trayopastambha*, the three important supporting pillars of life—along with *Ahara* (food) and *Brahmacharya*[1]. Proper and adequate sleep is described as essential for strength, nourishment, happiness, mental stability, and longevity[2]. Thus, *Nidra* is not merely a period of rest but an important physiological state necessary for the maintenance of overall health[3].

The concept of Homeostasis refers to the ability of the body to maintain a relatively stable internal environment despite continuous changes in the external and internal conditions. Various physiological systems, including the nervous, endocrine, cardiovascular, respiratory, metabolic, and immune systems, work together to maintain this internal balance. Sleep is closely integrated with these regulatory mechanisms and contributes significantly to the restoration and maintenance of physiological equilibrium.

From the modern physiological perspective, sleep is a complex and actively regulated state characterized by changes in consciousness, brain activity, autonomic function, metabolism, and hormonal secretion. Sleep homeostasis determines the body's need for sleep based on the duration and quality of previous sleep, while the circadian rhythm regulates the timing of the sleep–wake cycle. Together, these mechanisms ensure appropriate sleep and wakefulness according to the body's physiological requirements.

Adequate sleep supports several homeostatic functions, including energy regulation, thermoregulation, endocrine balance, immune function, cardiovascular regulation, neural recovery, and memory consolidation. Conversely, insufficient, excessive, or disturbed sleep may interfere with these processes and contribute to alterations in metabolic, hormonal, cognitive, and immune functions.

MATERIAL AND METHODS

Etymological Derivation of the Word *'Nidra'*

The word *Nidra* is derived from *nind+ ruk+tap= na lopa*.
The term *Nidra* origins ―*nindyate iti nidra*‖[4]
Means that ―Nothing loss is there.
Upanishads also explains about *avasthas* of *Nidra* like *Jagrutavastha, Swapnavastha, Sushiptavastha,* and *Trutiyavastha.*
Nidra is one among the *Adharaniya vega* which was explained by Charaka.[5]

Synonyms

Samhita's		**Synonyms**
Amarkosha	→	*Shayanam, Svapah, Svapnah, Samvesh*
Vaidyaka Shabda Sindhu	→	*Sambhashah,Suptih, Svapanam*
Charaka Samhita	→	*Bhutadhatri*[2]
Sushruta Samhita	→	*Vaishnavi Maya*[3]

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 12| Issue: 9| September 2026|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2026: 8.753 || ISI Value: 1.188

Definition

Samhita's		**Definition**
Charaka Samhita	→	When the mind (as well as soul) gets exhausted or becomes inactive and the sensory and motor organs become inactive then the individual gets sleep.[2]
Ashtanga Sangraha	→	The *Manovaha Strotas* become accumulated with *Sleshma* and mind is devoid of sense organs because of fatigue, when individual falls asleep[5].
Sushruta Samhita	→	The sleep occurs when the *Hridaya* the seat of Chetana is covered by *Tamas.*[3]

Types of *Nidra*

Acharya charaka[2]
1. Tamobhava
2. Shleshma-samudbhava
3.Manah-sharir-shrama-sambhava
4. Aagantuki
5. Vyadhyanuvartini
6.Ratrisvabhava-prabhava

Acharya Sushruta[3]
1. Vaishnavi Nidra
2. Tamsi Nidra
3. Tamobhuyishtha Nidra
4.Satvabhuyishtha Nidra
5.Vaikariki Nidra

According to Dalhana
1.Tamasika nidra
2.Swabhaviki nidra
3.Vaikariki nidra

Relation Between Age and Sleep[8].

Age	Hours of sleep required
Birth to 1 month	18-20 hrs.
1-6 months	15-18 hrs.
6 months – 1 year	14-16 hrs.
1-2 yrs.	12-14 hrs.
2-5 yrs.	10-12 hrs.
5-16 yrs.	9-10 hrs.
Adults	8 hrs.
Old persons	4-6 hrs

***Raatri-Jaagrana*.[2]**

***Raatri-jagarana* indications**
a. Persons with *kapha* constitution and *kaphaja* disorders.
b. Persons who are poisoned
c. Obese persons
d. Persons taking diet rich in fat

***Raatri-jagarana* effect**
a) Roughness in the body
b) Increases *vata* and *pitta*
c) Constipation
d) Weakness
e) Giddiness
f) Lack of concentration
g) Hyperacidity
h) Burning of eyes, hands and feet

Divaswapna

Acharya's	Indications	Contra-indications
Charaka	1) People exhausted by singing, study, alcoholic, sexual acts, elimination therapy, carrying heavy weight, walking long distance. 2)Those suffering from phthisis, wasting, thirst, diarrhea, colic pain, dyspnea, hiccup, insanity 3) Those who are too old, too young, weak and emaciated. 4) Those who are injured by fall and assault, those who are exhausted by journey by a vehicle, vigil, anger, grief and fear[2].	Persons with excessive fat, people who are addicted to taking unctuous substances, those with sleshmic constitution, those suffering from *dushivisha*[2].
Sushruta	1) It is permissible for 48 minutes in case of children, aged, emaciated by sexual intercourse, wasted due to chest wound, alcoholic addicts 2) Those tired by riding, travelling in carriage or on foot and by hard work, those having not taken food	1)Day-sleep is contra-indicated in all seasons except summers, in these too, it is permissible for a muhurta(48min) in some cases mention under indications of sleep.[3]

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 12| Issue: 9| September 2026|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2026: 8.753 || ISI Value: 1.188

Vagbhata	3) Suffering from deficiency of fat, sweat, *kapha*, *rasa* and blood and having indigestion. 4) Day-sleep is also desirable for half the normal period in case of those having awoken in night.[3] 1)Persons who are exhausted by long speaking, riding on animals or vehicles, walking long distances by enjoying excess drinks, sexual intercourse 2) Lifting and carrying heavy weights, who are tired by anger, grief and fear. Who are afflicted by dyspnea, hiccup, diarrhea. 3)Old,children,weak,emaciated, injured, thirsty, have pain, indigestion, are wounded and insane. 4) Those who are accustomed to daysleep.[7]	1)Persons who are very much fatty and have *kapha*-predominancy Who are habituated to oleation 2) Should not sleep during daytime[7].

Importance of *Nidra*

Charaka – *Nidra* is responsible for *Sukha, dukha, pusti, karshya, bala, abala, vrushata, klibata, gnyanam, agnyana* (ignorance), *Jivana*.[2]
depending on the proper or improper *nidra.*
Sushrutha – *Nidra* causes free from diseases, will have a pleasure in mind endowed with strength, color or complexion and virility[3].
Vagbhata - When *nidra* is observed judiciously, it will lead to happiness and long life just as the mind of the yogis become clear from knowledge of the soul and penance[6].
Kashyapa-Accepted that comfortable *nidra* is essential for milk production in mother[9].

Modern Perspective of Homeostasis

Homeostasis is a fundamental concept in modern physiology that refers to the ability of the human body to maintain a relatively stable internal environment despite continuous changes in external and internal conditions. It is essential for the normal functioning of cells, tissues, organs, and organ systems. The internal environment includes body temperature, blood glucose levels, blood pressure, pH, electrolyte concentrations, fluid balance, and oxygen and carbon dioxide levels.

Homeostasis is maintained through coordinated regulatory mechanisms involving the nervous system, endocrine system, kidneys, lungs, liver, and cardiovascular system. Most homeostatic mechanisms operate through negative feedback, in which a change in a physiological variable triggers response that counteract the initial disturbance. For example, when body temperature rises, sweating and dilation of skin blood vessels help dissipate heat and restore temperature toward its normal range[10].

Sleep is closely associated with homeostatic regulation. From a modern physiological perspective, sleep contributes to the regulation of energy metabolism, hormonal activity, immune responses, cognitive functions, and autonomic nervous system activity. Sleep itself is also regulated by homeostatic mechanisms that increase the drive to sleep during prolonged wakefulness[11].

Homeostatic regulation of sleep

Modern physiology explains sleep regulation through the two-process model:

1. Process S – Sleep homeostasis: Sleep pressure increases during wakefulness and decreases during sleep. For example, after staying awake for a prolonged period, a person experiences greater sleepiness.
2. Process C – Circadian rhythm: The internal biological clock, primarily located in the suprachiasmatic nucleus of the hypothalamus, coordinates the timing of sleep and wakefulness according to the approximately 24-hour day–night cycle[11].

These two processes interact to regulate sleep timing, duration, and intensity. Disruption of sleep patterns or circadian rhythms may affect metabolic regulation, cognitive performance, and other physiological functions

DISCUSSION

The physiology of *Nidra* in relation to homeostasis provides an important framework for understanding the role of sleep in maintaining the body's internal stability and overall health. Adequate sleep is associated with strength, nourishment, happiness, and longevity. These traditional concepts can be discussed alongside modern physiological evidence concerning sleep regulation, metabolic balance, neuroendocrine function, and restoration of physiological processes. Sleep contributes to this process by influencing multiple regulatory systems, including the nervous, endocrine, cardiovascular, metabolic, and immune systems. Rather than being a state of complete inactivity, sleep is an actively regulated physiological condition during which important processes related to neural function, energy utilization, and bodily regulation continue. sleep homeostasis, which regulates the body's need for sleep according to prior wakefulness and sleep. As wakefulness continues, sleep pressure increases, while adequate sleep reduces this pressure. The circadian timing system, coordinated primarily by the suprachiasmatic nucleus of the hypothalamus, interacts with sleep homeostasis to regulate the sleep–wake cycle. Together, these mechanisms help synchronize sleep with the body's physiological and environmental requirements[7].

Role of *Nidra* in Physiological Homeostasis

1. Neuroendocrine regulation

Sleep influences the secretion and regulation of several hormones involved in growth, metabolism, stress responses, and appetite. Growth hormone secretion is associated with slow-wave sleep, while sleep restriction can affect the

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 12| Issue: 9| September 2026|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2026: 8.753 || ISI Value: 1.188

regulation of appetite and glucose metabolism. These observations demonstrate the relationship between sleep and endocrine homeostasis.

2. Metabolic homeostasis

Adequate sleep supports glucose regulation, insulin sensitivity, appetite control, and energy balance. Persistent sleep deprivation has been associated with impaired glucose tolerance and alterations in appetite-regulating hormones. Therefore, regular and sufficient sleep is an important component of maintaining metabolic health.

3. Thermoregulation

Body temperature follows a circadian pattern, and sleep is associated with changes in heat production and heat loss. Changes in skin blood flow and the body's core temperature help coordinate sleep onset and maintenance. This illustrates the close relationship between sleep regulation and temperature homeostasis.

4. Nervous system homeostasis

Sleep supports learning, memory consolidation, synaptic regulation, and the maintenance of normal cognitive function. Different sleep stages contribute to different aspects of neural processing. Sleep disturbances may impair attention, memory, emotional regulation, and daytime performance.

5.Immune homeostasis

Sleep and immune function are closely interconnected. Sleep supports the coordinated regulation of immune responses, while infection and inflammation can alter sleep patterns. Chronic insufficient sleep has been associated with changes in immune function, highlighting the importance of adequate sleep in maintaining physiological balance.

6. Cardiovascular homeostasis

During normal sleep, particularly non-REM sleep, heart rate, blood pressure, and sympathetic nervous system activity generally decrease. These changes provide periods of reduced cardiovascular demand. Sleep disruption, especially when persistent, is associated with adverse cardiovascular and metabolic outcomes.

Ayurveda describes Nidra as an essential supporting factor for life, whereas modern physiology explains sleep through measurable processes involving brain activity, hormonal regulation, metabolism, and circadian rhythms. These perspectives can be considered complementary frameworks, although their concepts and mechanisms should not be assumed to be identical.

The Ayurvedic emphasis on Bala (strength), Pushti (nourishment), and Sukha (well-being) can be discussed in relation to modern research on physical recovery, metabolic regulation, and psychological health. However, these associations represent conceptual correlations rather than direct scientific equivalences.

CONCLUSION

The physiology of Nidra in homeostasis demonstrates that sleep is an essential, actively regulated biological process that contributes to the maintenance of internal physiological balance. Its influence extends across metabolic, neuroendocrine, immune, cardiovascular, and neurological functions. Integrating the Ayurvedic understanding of Nidra with modern sleep physiology offers a broader perspective on the importance of sleep in maintaining health and preventing disease. Understanding the relationship between Nidra and homeostasis highlights the importance of maintaining regular sleep schedules, obtaining sufficient sleep, and addressing persistent sleep disturbances. Sleep quality and duration are influenced by age, lifestyle, environmental conditions, stress, and underlying health conditions. Maintaining healthy sleep habits can support physiological regulation and general well-being.

REFERENCES

1. *Murthy K.R. Srikantha. Vagbhatta's Ashtanga Hridayam vol.I. Sutrasthana 7/64, 66, 67, 68. Edition-2013. Chowkhamba Krishnadas Academy. Varanasi. p.121.*
2. *Trikamji Vaidya Yadavji. Charaka-Samhita of Agnivesha. Sutrasthana Ashtauninditiya adhyay- 21/35, 36, 38, 39, 40, 41, 42, 43, 44, 45, 50, 52, 53, 54, 55, 56, 57, 59. Varanasi Chaukhamba Surbharti Prakashan. Reprint, 2013; 118, 119, 120.*
3. *Trikamji Vaidya Yadavji. editor Sushruta-Samhita of Sushruta. Sharirsthana Garbha Vyakaran adhyay- 4/33, 34, 38, 42, 43, 44, 45, 46, 47. Varanasi Chaukhamba Surbharti Prakashan. Reprint, 2012; 358, 359.*
4. *Dev.R.R Shabdakalpadruma 1 Reprint ed Delhi Nag Publishers, 2002; (4): 181.*
5. *Murthy K.R. Srikantha. Vagbhatta's Ashtanga Hridayam vol.I. Sutrasthana 4/12. Edition. Chowkhamba Krishnadas Academy. Varanasi, 2013; 47.*
6. *Murthy K.R. Srikantha. Vagbhatta's Ashtanga Hridayam vol.I. Sutrasthana 7/64, 66, 67, 68. Edition-2013. Chowkhamba Krishnadas Academy. Varanasi. p.121.*
7. *Rao B. Rama. Vagbhatta Sutrasthana. Ashtanga Sangraha vol.-I. Sutrasthana 9/46, 47, 48, 50, 51, 68. Edition. Chaukhambha Visvabharati. Varanasi, 2006; 174, 175, 177.*
8. *Ranade Subhash, Deshpande R.R., Bobade R.B. A Textbook of Swasthavritta. Reprint. Chaukhamba Sanskrit Pratishthan. Delhi, 2009; 40-41.*
9. *Kashyapa Samhita Sutrasthana, 19.*
10. *Hall JE, Hall ME. Guyton and Hall textbook of medical physiology. 15th ed. Philadelphia: Elsevier; 2026. Chapter 1*
11. *Guyton A.C., Hall J.E. Text book of Medical physiology. 12/e. States of Brain Activity- Sleep, Brain Waves, Epilepsy, Psychoses-59. Elsevier Saunders. Reprint, 2012; 721*